**18CS/IT 302**

**Hall Ticket Number:**

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| **II/IV B.Tech (Regular / Supplementary) DEGREE EXAMINATION** | | | |
| **February, 2021** | **Common to CSE & IT** | | |
| **Third Semester** | **Data Structures** | | |
| **Time:** Three Hours | | **Maximum:** 50 Marks | |
| *Answer ALL Questions from PART-A.* | | | (1X10 = 10 Marks) |
| *Answer* ***ANY FOUR*** *questions from PART-B.* | | | (4X10=40 Marks) |
| **Part - A** | | | |

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| 1. | Answer the following: | | (1X10=10 Marks) | |
|  | a) | What is meant by time complexity? | |  |
|  | b) | Define Data Structure. | |  |
|  | c) | What is the difference between arraylist and linked list? | |  |
|  | d) | Convert (a+b)\*c into reverse polish notation. | |  |
|  | e) | Write the applications of stack. | |  |
|  | f) | What is an expression tree? | |  |
|  | g) | Define binary tree. | |  |
|  | h) | What is a priority queue? | |  |
|  | i) | Define MinHeap. | |  |
|  | j) | What is hashing? | |  |
| **Part - B** | | | | |
| 2. | a) | Explain Asymptotic notations with an example. | | 5 M |
|  | b) | Write a C program to insert the element in given position of an arraylist. | | 5 M |
| 3. | a) | What are the time complexities of following recurrence relations?  T(n) = 2 T(n/2) + cn n>1  = 1 n=1  T(n) = T(n-1) + c n>=1  = 1 n=0 | | 5 M |
|  | b) | Explain the routines delete and find Element in single linked list. | | 5 M |
| 4. | a) | Explain the procedure to implement stack ADT using linked list. | | 5 M |
|  | b) | Explain Infix to postfix conversion with the following example.  ( ( A + B ) — C \* ( D / E ) ) + F | | 5 M |
| 5. | a) | Write a C program to implement Selection sort. | | 5 M |
|  | b) | Explain the procedure for evaluating postfix expression with the following example.  3 4 + 5 \* 2 4 - - | | 5 M |
| 6. |  | Explain the insertion of the following keys into an empty Binary Search Tree.  71, 15, 25, 36, 65, 44, 99, 8, 29, 58.  and explain procedure for removing 65 and 15 elements from BST. | | 10 M |
| 7. |  | What is AVL Tree? Explain the insertion of the following keys into an empty AVL tree.  15, 20, 24, 10, 13, 7, 30, 36, and 25.  Write pre-order, in-order and post-order traversals for every insertion of key. | | 10 M |
| **P.T.O.**  **18CS/IT 302** | | | | |
| 8. | a) | Explain the concept of separate chaining with hash table size of 7 and modulus hash function to insert the following elements.  25, 33, 55, 67, 54, 84, 28, 15 | | 5 M |
|  | b) | Write a C program to implement heap sort. | | 5 M |
| 9. | a) | Explain the collision with a simple example and List the collision resolution techniques. | | 3 M |
|  | b) | Explain linear probing with a hash table size of 11 and modulus hash function to insert the following elements.  96, 47, 63, 87, 65, 69, 94, 61 | | 7 M |

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